

SHIGELLOSIS

Potential Bioterrorism Agent: Category B

Also known as: Bacillary dysentery, Shigella

Responsibilities:

Hospital: Report by facsimile, mail or phone

Lab: Report by facsimile, mail or phone

Physician: Report by facsimile, mail or phone

Local Public Health Agency (LPHA): Follow-up required

Iowa Department of Public Health

Disease Reporting Hotline: (800) 362-2736

Secure Fax: (515) 281-5698

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Agent

Shigellosis refers to disease caused by any bacteria in the genus *Shigella*. There are four *Shigella* species: *S. dysenteriae* (Group A), *S. flexneri* (Group B), *S. boydii* (Group C), and *S. sonnei* (Group D). Some strains produce enterotoxin and Shiga toxin, which probably play a role in destructive ulcerations in the intestines once the organisms have invaded. This explains the watery and sometimes bloody diarrhea seen the first or second day of illness.

B. Clinical Description

Symptoms: are characterized by diarrhea (sometimes bloody) accompanied by fever, nausea and sometimes, vomiting, cramps and tenesmus (painful, especially ineffectual straining at stool or urination).

Onset: typically includes blood and mucus in stools, resulting from mucosal ulcerations and minute abscesses caused by the invasive organisms.

Complications: The most common complication is dehydration, but they may also include convulsions in young children. Other complications include intestinal perforation, hemolytic uremic syndrome and reactive post infectious arthropathy. The severity of illness is a function of the host (age and preexisting nutritional state), the serotype, and bacteria's ability to produce toxin. Death is uncommon in U.S., but common worldwide.

C. Reservoirs

Common reservoirs: Humans are the only significant reservoir.

D. Modes of Transmission

Person-to-Person: Transmitted via the fecal-oral route. A very small dose of *Shigella* is needed to cause illness (as low as 10 – 100 organisms); thus, it can be easily spread. Person-to-person spread typically occurs among household contacts and pre-school children in child care. Secondary attack rate in households can be as high as 40%. Transmission can also occur person-to-person through certain types of sexual contact (*e.g.*, oral-anal contact).

Foodborne: People shedding bacteria may contaminate food by failing to properly wash their hands before food handling, potentially causing large numbers of people to become ill.

Waterborne: Fecal contamination of untreated recreational water, such as fill and drain wading pools, can be a source for spread.

E. Incubation Period

The incubation period can vary from 12 - 96 hours, but is usually about 24 - 72 hours. It can be up to a week for *S. dysenteriae*.

F. Period of Communicability or Infectious Period

The disease is communicable as long as infected people excrete *Shigella* in their stool. This usually lasts less than 4 weeks from onset of illness; however, people are most infectious while having diarrhea. Very rarely, the asymptomatic carrier state may persist for months or longer; appropriate antibiotic treatment usually reduces duration of carriage to a few days. *Shigella* organisms readily develop antibiotic resistance; thus, antibiotics should be used judiciously.

G. Epidemiology

Shigellosis has a worldwide distribution, with millions of cases occurring annually. The majority of these cases occur in children under 10 years.

Outbreaks most often occur in child care centers, among men who have sex with men, and in settings where groups of people live in close contact. Diapered children playing in "kiddie" pools or other recreational water for young children filled with tap water without addition of chlorine or bleach can also easily spread *Shigella*.

H. Bioterrorism Potential

Category B Agent: *Shigella* has been identified as a potential category B bioterrorism agent as a food safety threat.

2) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To determine whether a case may be a source of infection for others (e.g., a diapered child, child care attendee, food handler, healthcare worker or child care provider) and if so, to prevent further transmission.
- To identify transmission sources of public health concern (e.g., a restaurant or a commercially distributed food product) and to stop transmission.

B. Laboratory and Healthcare Provider Reporting Requirements

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider must report. The preferred method of reporting is by utilizing the Iowa Disease Surveillance System (IDSS). However, if IDSS is not available, the reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736; fax number (515) 281-5698, mailing address:

IDPH, CADE
Lucas State Office Building, 5th Floor
321 E. 12th Street
Des Moines, IA 50319-0075

Postage-paid disease reporting forms are available free of charge from IDPH.

To request materials please visit the IDPH website:

idph.iowa.gov/Portals/1/userfiles/79/Documents/IDPH%20CADE%20Material%20Order%20Form.pdf

Laboratory Testing Services Available

All laboratories are required to submit all isolates cultured for further identification to aid in the public health surveillance necessary for this illness and to prevent further transmission. If exclusion testing is needed, testing should be done at SHL. Please work with the IDPH

C. Local Public Health Agency Follow-up Responsibilities

Case Investigation

Following notification, the LPHA(s) will complete an official investigation by interviewing the case and others who may be able to provide pertinent information. Much of the investigation information required can be obtained from the healthcare provider or the medical record. Investigation information should be entered into the Iowa Disease Surveillance System (IDSS).

- a. Use the following guidelines to complete the investigation:
 - 1) Record the demographic information, date of symptom onset, symptoms, diagnostic testing, date of specimen collection, laboratory conducting the testing, species identification and serotyping. Please request isolates to be sent to the SHL.
 - 2) When asking about exposure history (food, travel, activities, etc.), use the incubation period for shigellosis (12–96 hours). Specifically, focus on the period beginning a minimum of 12 hours prior to the case's onset back to 96 hours before onset.
 - 3) Record any restaurants at which the case ate during the incubation period, including food item(s) and date consumed. If it is suspected that the case became infected through food, further investigation may be needed
 - 4) Ask about travel history and outdoor activities to help identify where the case may have been infected.
 - 5) Ask about the case's water supply as well as recreational water activities because *Shigella* may be acquired through water consumption.
 - 6) A case history that includes household/close contacts, antimicrobial treatment, pet or other animal contact, child care, and food-handler questions is designed to look for possible exposure and also to assess potential for transmitting and risk to others. Important information from a public health perspective would include child care attendance or employment or food handling.
 - 7) If repeated attempts to obtain case information have been unsuccessful (*e.g.*, the case or healthcare provider does not return calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please complete the investigation with as much information as possible. Please note why any data is not complete. If using IDSS, select the appropriate reason under the Event tab in the Event Exception field.
- b. After compiling the information, enter into IDSS (the preferred method for investigation) or complete the investigation form, attach lab report(s) when available and fax (515) 281-5698 or mail (in an envelope marked "Confidential") to IDPH Center for Acute Disease Epidemiology. The mailing address is:

IDPH, CADE
Lucas State Office Building, 5th Floor
321 E. 12th Street
Des Moines, IA 50319-0075

3) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

Food handlers, healthcare providers, child care providers and children in child care with shigellosis must be excluded.

Minimum Period of Isolation of Patient

For food handlers, child care providers, and healthcare providers, two negative stool cultures must be obtained after resolution of diarrhea before they may return to work/child care. For child care attendees, the child must be excluded until 48 hours after the resolution of diarrhea or if prescribed antibiotics, until 24 hours after treatment with antibiotics has started AND 24 hours after diarrhea stops.

If a case has been treated with an antibiotic, the stool specimen shall not be submitted until at least 48 hours after completion of therapy. The two specimens required, must be taken at least 24 hours apart.

Shigella cases should not cook for others until at least 48 hours after diarrhea has resolved.

Minimum Period of Quarantine of Contacts

Food handlers, healthcare providers and child care attendees who are contacts to a case and symptomatic with diarrhea shall be considered the same as a case and they must comply with the above requirements.

Note: A food handler is any person directly preparing or handling food. This can include a patient-care or child care provider.

B. Protection of Contacts of a Case

- Wash your hands carefully and frequently with soap and water, especially after using the bathroom.
- Do not prepare food for others while you are sick. After you get better, wash your hands carefully with soap and water before preparing food for others.
- Stay home from childcare, school and food service facilities while sick. Your local health department may have a policy on when to return to childcare or school. Refer to your local health department website for more information.
- Avoid swimming until you have fully recovered.
- Wait to have sex (vaginal, anal, and oral) for one week after you no longer have diarrhea.

C. Managing Special Situations

Reported Incidence Is Higher than Usual/Outbreak Suspected

Child Care

Since shigellosis may be easily transmitted person-to-person through the fecal-oral route and fecal contamination is common in toddlers, it is important to carefully follow up on cases of shigellosis in child care settings. General recommendations include:

Children with *Shigella* infection who have diarrhea should be excluded until 48 hours after resolution of diarrhea or until 24 hours after treatment with antibiotics has started AND 24 hours after diarrhea stops.

- Children with *Shigella* infection who have no diarrhea but do have positive stool cultures should be excluded as above.
- Staff with *Shigella* infection should be excluded until their diarrhea is gone and they have 2 negative stool cultures. If treated with antibiotics, wait at least 48 hours after completion of antibiotics before obtaining the first stool specimen. Allow at least an additional 24 hours before obtaining the second specimen.
- Always ensure thorough cleaning of the child care and disinfection of classroom materials (such as toys).

School

Shigellosis may be easily transmitted person-to-person via the fecal-oral route in schools. General recommendations include:

- Students or non food-handling staff with *Shigella* infection who have diarrhea should be excluded until their diarrhea is gone.
- Students or staff who handle food and have *Shigella* infection (symptomatic or not) must not prepare food until their diarrhea is gone and they have two negative stool tests (submitted at least 48 hours after completion of antibiotic therapy, if antibiotics are given, and taken at least 24 hours apart).
- Ensure routine thorough cleaning of the environment.

Community Residential Programs

Actions taken in response to a case of shigellosis in a community residential program will depend on the type of program and the functional level of the residents.

In long-term care facilities, residents with shigellosis should be placed on Standard (including enteric) Precautions until their symptoms subside. Staff members who provide direct patient care (*e.g.*, feed patients, provide mouth or denture care, or give medications) should be excluded until two stools test negative as described above. Staff members with *Shigella* infection who do not provide direct patient care and are not food handlers should not work until their diarrhea is completely resolved. Routine thorough cleaning of the environment must also occur.

Reported Incidence Is Higher than Usual/Outbreak Suspected

If the number of reported cases of shigellosis in your city/town seems higher than usual, or if an outbreak is suspected, more intensive investigation is warranted. Consult with your field epidemiologist in CADE for guidance on prevention and surveillance for additional cases.

Note: Refer to [Iowa's Foodborne Illness Outbreak Investigation Manual](#).

D. Preventive Measures

Educate families with cases in households on ways to control spread.

Environmental Measures

If a food item is potentially implicated samples of the food should be obtained before any disposal of food items. The decision about testing the food can be made in consultation with the CADE and SHL. If a commercial product is suspected, CADE will coordinate follow-up with relevant agencies such as Iowa Department of Inspections and Appeals (DIA).

The general policy of SHL is to test only food samples implicated in suspected outbreaks, not single cases.

To prevent *Shigella* and other pathogens transmitted by the fecal-oral route, it is recommended that people:

- Wash your hands carefully and frequently with soap and water, especially after using the bathroom.
- Do not prepare food for others while you are sick. After you get better, wash your hands carefully with soap and water before preparing food for others.
- Stay home from childcare, school and food service facilities while sick. Your local health department may have a policy on when to return to childcare or school. Refer to your local health department website for more information.
- Avoid swimming until you have fully recovered.
- Wait to have sex (vaginal, anal, and oral) for one week after you no longer have diarrhea.

4) ADDITIONAL INFORMATION

The Council of State and Territorial Epidemiologists (CSTE) surveillance case definitions for Shigellosis can be found at: <http://wwwn.cdc.gov/nndss/case-definitions.html>

CSTE case definitions should not affect the investigation or reporting of a case that fulfills the criteria in this chapter. (CSTE case definitions are used by the state health department and the CDC to maintain uniform standards for national reporting.)

References

American Academy of Pediatrics. *Red Book: 2015 Report of the Committee on Infectious Diseases, 30th Edition*. Illinois, American Academy of Pediatrics, 2015.

Centers for Disease Control. Shigella website: www.cdc.gov/shigella/index.html

Heymann, D.L., ed. *Control of Communicable Diseases Manual, 20th Edition*. Washington, DC, American Public Health Association, 2015.